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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
WALKE, AMANDA C	
ART UNIT	**PAPER NUMBER**
1752	

DATE MAILED: 03/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	**Application No.** 10/686,031	**Applicant(s)** CAO ET AL.
	Examiner Amanda C Walke	**Art Unit** 1752

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-26 are rejected under 35 U.S.C. 102(e) as being anticipated by Barclay et al (6,849,376).

Barclay et al disclose polymers of the invention contain one or more 1) carbonate units and/or 2) a lactone provided by a monomer having a ring oxygen adjacent to the monomer vinyl group. The invention also provides photoresists that contain such polymers, particularly for imaging at short wavelengths such as sub-200 nm. present invention relates to new polymers that contain units of fused carbonate groups and/or a lactone provided by a monomer having a ring oxygen adjacent to the monomer vinyl group. Polymers of the invention are highly useful as a resin component for photoresist compositions, particularly chemically-amplified positive-acting resists that can be effectively imaged at short wavelengths such as sub-200 nm, particularly 193 nm. Preferred polymers of the invention also may contain a carbon alicyclic group (i.e. the group has all carbon ring members) that is fused to the polymer backbone, i.e. the carbon alicyclic ring has at least two carbon ring members that comprise the polymer backbone. Polymers of the invention contain one or more 1) carbonate units (such as provided by reaction of a vinyl carbonate e.g. vinylene carbonate) and/or 2) a lactone provided by a monomer having a ring oxygen adjacent to the monomer vinyl group such as alpha-angelicalactone and gamma-methylene-y-butyrolactone. Preferred fused carbon alicyclic groups are provided by polymerization of cyclic olefin (endocyclic double bond) compounds such as optionally substituted norbornene groups. Preferred heteroalicyclic polymer units may be substituted, e.g. by heteroalkyl groups such as ethers (alkoxy) preferably having 1 to about 10 carbon atoms, alkylthio preferably having 1 to about 10 carbon atoms, alkylsulfinyl preferably 1 to about 10 carbon atoms, alkylsulfonyl preferably having 1 to about 10 carbon atoms, and the like. It has been surprising found that such substituents can provide enhanced lithographic results, particularly enhanced substrate adhesion. For use in photoresist compositions, polymers of the invention also will contain one or more units that comprise photoacid-labile moieties. The photoacid-labile group may be a substituent of one or more of the above-mentioned units, such as a substituent of a polymerized vinyl alicyclic ether, vinyl alicyclic thioether or carbon alicyclic group. The photoacid labile moiety also may be present as an additional polymer unit, e.g. as a polymerized alkyl acrylate or alkylmethacrylate, particularly an acrylate having an alicyclic moiety such as methyladamantyl acrylate or methyladamantyl methacrylate. Preferred alicyclic photoacid-labile moieties are tertiary ester alicyclic hydrocarbon groups that have two or more fused or bridged rings. Preferred tertiary ester groups include optionally substituted adamantyl, particularly methyl adamantyl as mentioned above; optionally substituted fencyl groups, particularly ethyl fencyl; optionally substituted pinanyl; and optionally substituted tricyclo decanyl particularly an alkyl-substituted tricyclo decanyl such as 8-ethyl-8-tricyclodecanyl e.g. as provided by polymerization of 8-ethyl-8-tricyclodecanyl acrylate and 8-ethyl-8-tricyclodecanyl methacrylate. Additional alicyclic ester groups also will be suitable, including additional bicyclic, tricyclic and other polycyclic moieties. Polymers of the invention also may contain units in addition to the above groups. For example, polymers of the invention also may contain nitrile units such as provided by polymerization of methacrylonitrile and acrylonitrile. Additional contrast enhancing groups also may be present in polymers of the invention, such as groups provided by polymermization of methacrylic acid, acrylic acid, and such acids protected as photoacid labile esters, e.g. as provided by reaction of ethoxyethyl methacrylate, t-butoxy methacrylate, t-butylmethacrylate and the like. Generally preferred polymers of the invention contain 3, 4 or 5 distinct repeat units, i.e. preferred are terpolymers, tetrapolymers and pentapolymers that contain one or more heteroalicyclic groups as disclosed herein. Particularly preferred polymers of the invention include: 1) a polymer that contains distinct repeat units of i) a carbonate and/or lactone as discussed above; ii) maleic anhydride; and iii) an acrylate or methacrylate including those that contain a photoacid-labile group such as t-butylacrylate, adamantylacrylate and the like; 2) a polymer that contains distinct repeat units of i) a carbonate and/or lactone as discussed above; ii) maleic anhydride; and iii) a vinyl alicyclic, including carbon alicyclics and heteroalicyclics as discussed above; 3) a polymer that contains distinct repeat units of i) a carbonate and/or lactone as discussed above; ii) maelic anhydride; and iii) a vinyl alicyclic, including carbon alicyclics and heteroalicyclics as discussed above; and 4) a polymer that contains distinct repeat units of i) a carbonate and/or lactone as discussed above; ii) maleic anhydride; iii) a vinyl alicyclic, including carbon alicyclics and heteroalicyclics as discussed above; and iv) an acrylate or methacrylate including those that contain a photoacid-labile group such as t-butylacrylate, adamantylacrylate and the like. Photoresists of the invention also may contain other optional materials. For example, other optional additives include antistriation agents, plasticizers, speed enhancers, etc. Such optional additives typically will be present in minor concentrations in a photoresist composition except for fillers and dyes which may be present in relatively large concentrations, e.g., in amounts of from about 5 to 30 percent by weight of the total weight of a resist's dry components. The resists of the invention can be readily prepared by those skilled in the art. For example, a photoresist composition of the invention can be prepared by dissolving the components of the photoresist in a suitable solvent such as, for example, ethyl lactate, ethylene glycol monomethyl ether, ethylene glycol monomethyl ether acetate, propylene glycol monomethyl ether, propylene glycol monomethyl ether acetate and 3-ethoxyethyl propionate. Typically, the solids content of the composition varies between about 5 and 35 percent by weight of the total weight of the photoresist composition. The resin binder and photoactive components should be present in amounts sufficient to provide a film coating layer and formation of good quality latent and relief images.

Given the teachings of the reference, the instant claims are anticipated.

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Eichenauer et al (5,071,921), Murai et al (4,835,213), Fujimori et al (6,692,884), Koleske et al (4,680,361), Naylor (4,360,643), Gould (4,156,066), Yoon et al (6,537,727), Lundy et al (6,045, 973, 6,054,252, and 6,166,245), Kinsho et al (6,472,543), Szmanda et al (6,406,828 and 6,599,677), Wardle et al (6,350,330), Keoshkerian et al (5,739,229), and Hsieh et al (4,603,171) are cited for their teachings of similar polymers.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Amanda C Walke whose telephone number is 571-272-1337. The examiner can normally be reached on M-R 5:30-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Amanda C Walke
Examiner
Art Unit 1752

ACW
March 18, 2005